



Department of Environmental Quality

To protect, conserve and enhance the quality of Wyoming's environment for the benefit of current and future generations.



Matthew H. Mead, Governor

Todd Parfitt, Director

March 31, 2016

Mr. Charles Cornell
Sr. Regulatory Lead
Jonah Energy LLC
707 17th Street, Suite 2700
Denver, CO 80202

Permit No. **P0020602**

Dear Mr. Cornell:

The Division of Air Quality of the Wyoming Department of Environmental Quality has completed final review of Jonah Energy LLC's application to modify the drill rig fleet located in the Jonah and Pinedale Anticline Development Area (JPDA) in Sublette County, Wyoming. The current drill rig fleet is authorized under CT-8122A3 to operate with a total actual annual NO_x emissions from all drill rig engines and boilers associated with the Jonah Energy LLC Drill Rig Fleet of 282.0 tons per year (tpy). Jonah Energy LLC is requesting to modify the drill rig fleet to 200.0 tpy total actual annual NO_x emissions from all drill rig engines and boilers associated with the Jonah Energy LLC Drill Rig Fleet.

Following this agency's proposed approval of the request as published February 19, 2016, and in accordance with Chapter 6, Section 2(m) of the Wyoming Air Quality Standards and Regulations, the public was afforded a thirty (30) day period in which to submit comments concerning the proposed modification, and an opportunity for a public hearing. No comments have been received. Therefore, on the basis of the information provided to us, approval to modify the Drill Rig Fleet as described in the application is hereby granted pursuant to Chapter 6, Section 2 of the regulations with the following conditions:

1. That authorized representatives of the Division of Air Quality be given permission to enter and inspect any property, premise or place on or at which an air pollution source is located or is being constructed or installed for the purpose of investigating actual or potential sources of air pollution and for determining compliance or non-compliance with any rules, standards, permits or orders.
2. That all substantive commitments and descriptions set forth in the application for this permit, unless superseded by a specific condition of this permit, are incorporated herein by this reference and are enforceable as conditions of this permit.
3. That all notifications, reports and correspondences associated with this permit shall be submitted to the Stationary Source Compliance Program Manager. Submissions may be done electronically through <https://airimpact.wyo.gov> to satisfy requirements of this permit.
4. This permit only applies to the Jonah Energy LLC Drill Rig Fleet while operating in the Jonah and Pinedale Anticline Development Area (JPDA) and Normally Pressurized Lance (NPL). The permit conditions contained herein are only enforceable while operating drill rigs in the JPDA and NPL.
 - i. The JPDA and NPL area consists of 109W & R110W in T34N, R109W & R110W in T33N, R108W, R109W & R110W in T32N, R108W, R109W & R110W in T31N, R107W, R108W & R109W in T30N, R107W, R108W, R109W, & R110W in T29N, R107W, R108W, R109W, & R110W in T28N, and R107W, R108W & R109W in T27N.

5. That written notification of the actual date of initial start-up for each drill rig/engine/boiler is required fifteen (15) days after start-up as defined in Condition 9. Such notification shall be submitted on a complete AQD-RIG Installation/Removal form. The form can be downloaded from the Air Quality website <http://deq.wyoming.gov/aqd> or obtained from the Air Quality Division.
6. That upon removal of a drill rig/engine/boiler from the JPDA/NPL, written notification is required within fifteen (15) days of removal. Such notification shall be submitted on a complete AQD-RIG Installation/Removal form.
7. That emissions shall be limited as follows:
 - i. Total actual annual NO_x emissions from all drill rig engines and boilers associated with the Jonah Energy LLC Drill Rig Fleet shall not exceed 200.0 tons per year (tpy) NO_x.
 - ii. Emissions from the natural gas fired drill rig engines in the Jonah Energy LLC Drill Rig Fleet shall not exceed the values in the following table.

Equipment	NO _x	CO	Formaldehyde
	g/hp-hr	g/hp-hr	g/hp-hr
Natural Gas Engines	1.49	0.5	0.07

1. Lean burn engines shall be equipped with oxidation catalyst.
 2. Rich burn engines shall be equipped with NSCR and an AFRC.
- iii. Total actual annual NO_x emissions from engines on any diesel fired drill rig in the Jonah Energy LLC Drill Rig Fleet shall not exceed 10 tpy per drill rig.
 1. Drill rig engines equipped with SCR shall have a minimum NO_x control efficiency of ninety percent (90%).
8. Ammonia slip from each SCR air pollution control system shall not exceed 10 ppm_v at fifteen percent (15%) O₂ as measured by initial and periodic testing.
9. Jonah Energy LLC shall conduct an initial performance test for each drill rig engine no later than ninety (90) days after start-up. Startup shall be defined as follows:
 - i. For drill rig engines in service when CT-8122 was issued, the start-up date shall be January 4, 2010.
 - ii. For all other drill rig engines, the start-up date shall be the date the rig commences drilling at the first well.

10. Initial performance testing as required by Condition 9 of this permit shall be conducted on the drill rig engines as follows:

i. Natural gas fired engines

NO_x and CO Emissions: Testing for NO_x and CO emissions shall consist of three (3) 1-hour tests following EPA approved reference methods or the State of Wyoming's Portable Analyzer protocol to determine compliance with the g/hp-hr limits. Results shall be reported in terms of g/hp-hr. Emissions shall be calculated using the following equations:

$$g/hp - hr NO_x = (ppm NO_{x \text{ corrected}})(1.19 \times 10^{-7})(F_factor)\left(\frac{20.9}{20.9 - O_2\%_{corrected}}\right) \\ (Brake \text{ Specific Fuel Consumption}(Btu / hp - hr))(10^{-6})(454)$$

$$g/hp - hr CO = (ppm CO_{corrected})(7.27 \times 10^{-8})(F_factor)\left(\frac{20.9}{20.9 - O_2\%_{corrected}}\right) \\ (Brake \text{ Specific Fuel Consumption}(Btu / hp - hr))(10^{-6})(454)$$

VOC Emissions: Testing for VOCs shall be conducted in accordance with a Division approved test method for one (1) engine of each engine type in the fleet.

Formaldehyde Emissions (Lean Burn Engines Only): Each engine shall be tested for formaldehyde. Testing shall consist of three (3) 1-hour tests following EPA approved reference methods or a Division approved formaldehyde test method. Emissions shall be calculated using the following equation:

$$g/hp - hr HCHO = (ppm HCHO_{corrected})(7.79 \times 10^{-8})(F_factor)\left(\frac{20.9}{20.9 - O_2\%_{corrected}}\right) \\ (Brake \text{ Specific Fuel Consumption}(Btu / hp - hr))(10^{-6})(454)$$

- ii. For diesel-fired drill rig engines equipped with SCR

NO_x Emissions: Compliance testing for NO_x shall be conducted in accordance with EPA approved reference methods or the State of Wyoming's Portable Analyzer Protocol. Testing shall consist of three (3) runs conducted at the inlet and outlet of the SCR system to determine the NO_x control efficiency. Results shall be reported in terms of percent control efficiency and g/hp-hr. Emissions shall be calculated using the following equation:

$$g/hp - hr NO_x = (ppm NO_{x\ corrected})(1.19 \times 10^{-7})(F_factor)\left(\frac{20.9}{20.9 - O_2\%_{corrected}}\right) \\ (Brake\ Specific\ Fuel\ Consumption(Btu / hp - hr))(10^{-6})(454)$$

CO Emissions: Testing for CO shall be conducted in accordance with EPA approved reference methods or the State of Wyoming's Portable Analyzer protocol. Results shall be submitted in terms of g/hp-hr. Brake Specific Fuel Consumption (BSFC) shall be provided in the report.

$$g/hp - hr CO = (ppm CO_{corrected})(7.27 \times 10^{-8})(F_factor)\left(\frac{20.9}{20.9 - O_2\%_{corrected}}\right) \\ (Brake\ Specific\ Fuel\ Consumption(Btu / hp - hr))(10^{-6})(454)$$

VOC Emissions: Compliance testing for VOCs shall be conducted in accordance with a Division approved test method for one (1) engine of each engine type in the fleet.

Ammonia Slip: Compliance testing for ammonia slip shall be conducted using Draeger-Tube detectors or other methods as approved by the Administrator.

Formaldehyde Emissions: Testing for formaldehyde shall be conducted in accordance with a Division approved test method for one (1) engine of each engine type in the fleet.

Urea flow (gph and /or liters per hour), engine load (%) and/or boost pressure (psi), and catalyst inlet temperature (°F and/or °C) shall be recorded during each run and submitted with the test report. Brake specific fuel consumption (BSFC) shall be reported with the results for the initial performance test.

A test protocol shall be submitted for review and approval prior to testing. Notification of the test date shall be provided to the Division fifteen (15) days prior to testing. Results shall be submitted to the Division within forty-five (45) days of completion. Engine load (%) and brake specific fuel consumption (BSFC) shall be provided in the report.

11. That Jonah Energy LLC shall follow the testing requirements as follows for each drill rig engine:
- i. For natural gas engines, each drill rig engine shall be tested semi-annually. The first semi-annual test is required six (6) months after completion of the initial performance tests required under Condition 9. Testing for NO_x and CO shall be conducted in accordance with EPA approved reference methods or the State of Wyoming's Portable Analyzer protocol. Compliance with the CO limits is considered verification that the VOC and formaldehyde emissions for the lean burn engines are controlled. Emissions shall be calculated using the equations listed in Condition 10.
 - ii. For drill rig engines equipped with SCR, each drill rig engine shall be tested quarterly. The first quarterly test is required the following calendar quarter after completion of the initial performance tests specified under Condition 10.
 1. Testing for NO_x shall be conducted in accordance with EPA approved reference methods or the State of Wyoming's Portable Analyzer protocol. Testing shall consist of one (1) ten (10) minute run conducted at the inlet and outlet of the SCR system to determine the NO_x control efficiency. Results shall be submitted in terms of percent control efficiency and g/hp-hr. Brake Specific Fuel Consumption (BSFC) shall be provided in the report. Emissions shall be calculated using the equation listed in Condition 10.
 2. Testing for ammonia slip shall be conducted using Draeger-Tube detectors or other methods as approved by the Administrator.
 3. Urea flow (gph and /or liters per hour), engine load (%) and/or boost pressure (psi), and catalyst inlet temperature (°F and/or °C) shall be recorded during each run and submitted with the test report.
 - iii. A test protocol shall be submitted for review and approval prior to testing. Notification of the test date shall be provided to the Division fifteen (15) days prior to the testing. Results shall be submitted to the Division with forty-five (45) days of completing the tests. The engine load (%) and brake specific fuel consumption (BSFC) shall be provided in the report.
 - iv. The Air Quality Division shall be notified within twenty-four (24) hours of the testing/monitoring required by this condition that shows operation outside the permitted emission limits. By no later than seven (7) calendar days of such testing/monitoring event, the owner or operator shall repair and retest/monitor the affected engine to demonstrate that the engine has been returned to operation within the permitted emission limits. Compliance with this permit condition regarding repair and retesting/monitoring shall not be deemed to limit the authority of the Air Quality Division to cite the owner or operator for an exceedance of the permitted emission limits for any testing/monitoring required by this condition which shows noncompliance.

12. That Jonah Energy LLC shall follow the monitoring and maintenance requirements as follows:

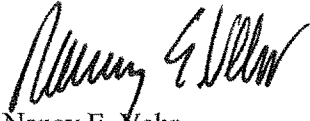
- i. For natural gas-fired engines equipped with an oxidation catalyst or NSCR catalyst, operate and maintain the engine, air pollution control equipment, and monitoring equipment according to good air pollution control practices at all times, including startup, shutdown, and malfunction.
- ii. For diesel-fired engines equipped with an SCR catalyst, operate and maintain the engine, SCR system and monitoring equipment according to good air pollution control practices at all times, including startup, shutdown, and malfunction. The SCR system shall be operated at all times the drill rig is operating in the JPDA or NPL, except when the engine catalyst inlet temperature is less than 500°F. Records shall be kept to document periods when the SCR system is not operating and the engine is operating. The records shall include date, duration and cause.
- iii. Operate the SCR Emission Control System in accordance with the manufacturer's recommendations which includes visually inspecting the catalysts and cleaning as necessary. Records shall be maintained of catalyst maintenance and replacement. Upon replacement of the catalyst, performance tests as specified by Condition 10 shall be conducted.
- iv. For drill rigs in use equipped with a SCR system, records of urea flow (gph and /or liters per hour), engine load (%) and/or boost pressure (psi), and catalyst inlet temperature (°F and/or °C) shall be recorded, at minimum, daily when the engine is operating. Records of interim spot checks conducted to verify catalyst condition and any maintenance or corrective actions shall be kept for a period of at least five (5) years and shall be made available to the Division upon request.
- v. All drill rigs in use equipped with a SCR system shall be equipped with a datalogger to record urea flow (gph and /or liters per hour), engine load (%) and/or boost pressure (psi), and catalyst inlet temperature (°F and/or °C). Upon startup, new drill rig engines equipped with SCR require a datalogger. Data shall be recorded on an interval of fifteen (15) minutes or less. Records shall be kept for a period of at least five (5) years and shall be made available to the Division upon request.

13. Jonah Energy LLC shall keep records of the following for each well drilled.
- i. Drill Rig ID
 - ii. Well API number
 - iii. Well name
 - iv. Well location (longitude, latitude, elevation)
 - v. Drilling start and end dates
 - vi. Field name
 - vii. Equipment description, controls, and site rating
 - viii. Brake specific fuel consumption (BSFC)
 - ix. Total fuel usage for drill rig engines and boilers recorded on a daily basis
 - x. Heat content and sulfur content of fuel burned recorded from supplier certification
 - xi. Actual emissions for NO_x, CO, VOC, SO₂, PM₁₀, ammonia, and formaldehyde
1. For engines, emissions shall be based on fuel consumption, g/hp-hr emission rates, and BSFC. Information recorded in Condition 12 regarding catalyst operation shall also be utilized to calculate emissions from the engines.
 2. For boilers, emissions shall be based on fuel consumption, lb/MMBtu rates or AP-42 factors converted to lb/MMBtu, and BSFC
- The format presented in Appendix A shall be utilized to satisfy reporting requirements for the Division's annual emission inventory, which shall be submitted by March 31 of the following calendar year.
14. That drill rigs, boilers or engines that are subject to the conditions of this permit may be replaced without modifying this permit. Jonah Energy LLC shall provide notifications as required by Conditions 5 and 6 of this permit. The replacement drill rig/engine(s)/boiler(s) shall comply with the conditions of this permit.
15. All records required under this permit shall be kept for a period of at least five (5) years and shall be made available to the Division upon request.
16. That should drill rig engine(s) meet the definition of a stationary source, Jonah Energy LLC shall comply with all state and federal regulations applicable for stationary sources.
17. Jonah Energy LLC shall comply with all local, state, and federal rules and regulations applicable to the Drill Rig Fleet.
18. Effective upon permit issuance, this permit shall supersede Air Quality Permit CT-8122A3 for the Drill Rig Fleet.

It must be noted that this approval does not relieve you of your obligation to comply with all applicable county, state, and federal standards, regulations or ordinances. Special attention must be given to Chapter 6, Section 2 of the Wyoming Air Quality Standards and Regulations. Any appeal of this permit as a final action of the Department must be made to the Environmental Quality Council within sixty (60) days of permit issuance per Section 16, Chapter I, General Rules of Practice and Procedure, Department of Environmental Quality.

If we may be of further assistance to you, please feel free to contact this office.

Sincerely,



Nancy E. Vehr
Administrator
Air Quality Division



Todd Parfitt
Director
Dept. of Environmental Quality.

Appendix A

Drill Rig Emission Reporting Form

Drill Rig Emissions - 2009

Diesel Fuel Consumption

(Sample data entries provided below for January through December 2009)

2009 Drill Rig Diesel Fuel Consumption												
	Rig #1 (gallons)	Rig #2 (gallons)	Rig #3 (gallons)	Rig #4 (gallons)	Rig #5 (gallons)	Rig #6 (gallons)		Rig	Wells	Jan (gallons)	Totals (gallons)	
January												
1	1,600	1,850	1,572	1,800	2,070	1,755		Rig #1	Well #1	41,995	41,995	
2	1,700	2,054	2,390	1,800	1,380	1,990			Well #2	-	-	
3	1,500	1,848	1,572	1,800	2,070	1,726				-	41,995	
4	1,500	1,221	1,889	1,440	1,380	1,274		Rig #2	Well #3	19,696	19,696	
5	1,600	1,848	1,753	1,800	2,300	1,345			Well #4	37,136	37,136	
6	1,000	2,054	1,591	1,620	1,840	978			Well #5	-	-	
7	600	1,848	1,591	1,620	1,870	748				-	56,834	
8	1,000	2,054	1,492	1,400	1,940	1,744		Rig #3	Well #6	31,060	31,060	
9	1,200	811	1,809	1,620	1,610	1,153			Well #7	19,579	19,579	
10	1,200	1,848	1,572	1,620	1,840	2,347			Well #8	-	-	
11	1,500	1,233	1,594	1,440	1,610	1,761				-	50,639	
12	1,200	1,027	1,978	1,440	1,840	1,951		Rig #4	Well #9	42,580	42,580	
13	1,300	1,077	1,897	1,800	1,840	1,996			Well #10	8,620	8,620	
14	1,300	1,302	2,341	1,700	1,610	1,848			Well #11	-	-	
15	1,122	2,054	1,992	1,440	1,610	1,980				-	51,200	
16	1,496	1,848	1,580	1,800	1,840	1,476		Rig #5	Well #12	23,490	23,490	
17	1,122	1,848	1,343	1,620	1,610	1,623			Well #13	33,510	33,510	
18	1,122	2,054	1,134	1,080	1,850	1,274			Well #14	-	-	
19	855	1,054	722	2,340	1,850	1,920				-	57,000	
20	1,496	2,054	722	1,860	2,070	1,585		Rig #6	Well #15	9,068	9,068	
21	1,870	1,848	1,631	2,180	1,840	1,284			Well #16	38,110	38,110	
22	1,663	2,054	1,643	1,980	1,610	1,444			Well #17	-	-	
23	1,496	2,054	2,112	1,580	1,610	1,747			Well #18	-	-	
24	2,203	2,054	1,621	1,620	1,610	1,740				-	47,178	
25	1,309	1,848	1,622	1,280	2,340	1,303				-	-	
26	1,496	2,054	1,622	900	1,610	978				-	-	
27	1,309	1,848	1,622	700	2,070	1,585				-	-	
28	1,309	2,054	1,643	1,800	1,840	1,658				-	-	
29	1,309	2,054	1,643	1,800	1,840	1,658				-	-	
30	1,309	2,054	1,643	1,800	1,840	1,658				-	-	
31	1,309	2,054	1,643	1,800	1,840	1,658				-	-	
Subtotal	41,995	56,834	50,639	51,200	57,000	47,178						
February												
1	1,600	1,850	1,572	1,800	2,070	1,755		Rig #1	Well #1	38,068	38,068	
2	1,700	2,054	2,390	1,800	1,380	1,990			Well #2	-	-	
3	1,500	1,848	1,572	1,800	2,070	1,726				-	38,068	
4	1,500	1,221	1,889	1,440	1,380	1,274		Rig #2	Well #3	19,696	19,696	
5	1,600	1,848	1,753	1,800	2,300	1,345			Well #4	30,976	30,976	
6	1,000	2,054	1,591	1,620	1,840	978			Well #5	-	-	
7	600	1,848	1,591	1,620	1,870	748				-	50,672	
8	1,000	2,054	1,492	1,400	1,840	1,744		Rig #3	Well #6	31,060	31,060	
9	1,200	811	1,809	1,620	1,610	1,454			Well #7	14,755	14,755	
10	1,200	1,848	1,572	1,620	1,840	2,347			Well #8	-	-	
11	1,500	1,233	1,594	1,440	1,610	1,761				-	45,815	
12	1,200	1,027	1,978	1,440	1,840	1,951		Rig #4	Well #9	42,580	42,580	
13	1,300	1,077	1,897	1,800	1,840	1,933			Well #10	2,680	2,680	
14	1,300	1,302	2,341	1,700	1,610	1,848			Well #11	-	-	
15	1,122	2,054	1,992	1,440	1,610	1,980				-	45,260	
16	1,496	1,848	1,580	1,800	1,840	1,476		Rig #5	Well #12	23,490	23,490	
17	1,122	1,848	1,343	1,620	1,610	1,623			Well #13	27,990	27,990	
18	1,122	2,054	1,134	1,080	1,850	1,274			Well #14	-	-	
19	855	1,054	722	2,340	1,850	1,920				-	51,460	
20	1,496	2,054	722	1,860	2,070	1,585		Rig #6	Well #15	9,068	9,068	
21	1,870	1,848	1,631	2,180	1,840	1,284			Well #16	35,803	35,803	
22	1,663	2,054	1,643	1,980	1,610	1,444			Well #17	-	-	
23	1,496	2,054	2,112	1,580	1,610	1,747			Well #18	-	-	
24	2,203	2,054	1,621	1,620	1,610	1,740				-	44,671	
25	1,309	1,848	1,622	1,280	2,340	1,303				-	-	
26	1,496	2,054	1,622	900	1,610	978				-	-	
27	1,309	1,848	1,622	700	2,070	1,585				-	-	
28	1,309	2,054	1,643	1,800	1,840	1,658				-	-	
Subtotal	38,068	50,672	45,815	45,260	51,460	44,671						
March												
1	1,600	1,850	1,572	1,800	2,070	781		Rig #1	Well #1	5,200	5,200	
2	800	1,848	1,580	1,800	1,550	1,587			Well #2	31,822	31,822	
3	900	2,054	1,332	1,070	1,840	2,498				-	37,022	
4	1,200	1,848	1,943	1,820	1,840	885		Rig #2	Well #3	-	-	
5	800	1,848	1,223	1,780	1,340	1,303			Well #4	10,656	10,656	
6	600	2,054	1,591	1,620	1,840	1,945			Well #5	38,856	38,856	
7	600	1,848	1,591	1,620	1,870	1,591				-	49,512	
8	855	821	1,878	1,380	400	1,977		Rig #3	Well #6	-	-	
9	1,000	1,233	1,510	1,400	600	2,152			Well #7	22,447	22,447	
10	1,000	1,232	1,810	1,610	1,733	1,733			Well #8	25,588	25,588	
11	1,300	1,848	1,870	1,440	2,070	1,783				-	48,035	
12	1,150	1,643	1,583	1,440	1,840	1,594		Rig #4	Well #9	-	-	
13	1,190	1,848	1,833	1,440	1,840	1,958			Well #10	37,400	37,400	
14	1,000	1,232	1,990	1,720	1,780	1,685			Well #11	10,270	10,270	
15	1,122	1,648	1,250	1,250	1,610	1,959				-	47,870	
16	1,122	2,054	1,860	1,570	1,610	1,990		Rig #5	Well #12	-	-	
17	855	1,643	1,178	1,380	1,840	2,364			Well #13	10,730	10,730	
18	1,000	1,848	1,591	1,800	1,580	1,878			Well #14	41,160	41,160	
19	1,122	2,054	1,591	1,620	2,070	1,172				-	51,690	
20	1,122	811	1,562	1,620	1,870	600		Rig #6	Well #15	-	-	
21	1,300	1,848	1,701	1,800	2,070	600			Well #16	-	-	
22	1,122	1,643	1,168	1,250	1,870	750			Well #17	38,736	38,736	
23	1,150	2,054	1,587	1,020	1,560	950			Well #18	4,119	4,119	
24	1,122	2,054	1,594	1,250	2,070	1,012				-	42,855	
25	1,300	1,232	1,572	750	2,070	720				-	-	
26	1,122	800	1,705	1,260	1,970	650				-	-	
27	1,309	1,438	1,158	1,980	1,380	620				-	-	
28	1,122	1,848	1,580	1,720	1,610	820				-	-	
29	1,309	2,054	1,398	1,320	1,840	943				-	-	
30	1,309	2,640	1,974	1,820	1,610	850				-	-	
31	1,309	1,428	1,121	1,620	1,380	1,183				-	-	
Subtotal	37,022	49,512	48,035	47,870	51,890	42,855						

Drill Rig Emissions - 2009

Natural Gas Consumption

(Sample data entries provided below for January through December 2009)

2009 Drill Rig Natural Gas Consumption									
	Rig #1 (gallons)	Rig #2 (gallons)	Rig #3 (gallons)	Rig #4 (gallons)	Rig #5 (gallons)	Rig #6 (gallons)	Rig	Wells	Jan (gallons)
January									Totals (gallons)
1	1,600	1,850	1,572	1,800	2,070	1,755	Rig #1	Well #1	41,995
2	1,700	2,054	2,390	1,800	1,380	1,990		Well #2	-
3	1,500	1,848	1,572	1,800	2,070	1,726			41,995
4	1,500	1,221	1,889	1,440	1,380	1,274	Rig #2	Well #3	19,696
5	1,600	1,848	1,753	1,800	2,300	1,345		Well #4	37,138
6	1,000	2,054	1,591	1,620	1,840	978		Well #5	-
7	600	1,848	1,591	1,620	1,870	743			56,834
8	1,000	2,054	1,452	1,400	1,840	1,704	Rig #3	Well #6	31,060
9	1,200	811	1,809	1,620	1,610	1,153		Well #7	19,579
10	1,200	1,848	1,572	1,620	1,840	2,387		Well #8	-
11	1,500	1,233	1,594	1,440	1,610	1,281			50,638
12	1,200	1,027	1,978	1,440	1,840	1,561	Rig #4	Well #9	42,580
13	1,300	1,897	1,897	1,800	1,840	1,906		Well #10	8,620
14	1,300	1,307	2,341	1,700	1,700	1,303		Well #11	-
15	1,122	2,054	1,902	1,440	1,610	1,980			51,200
16	1,496	1,848	1,591	1,800	1,340	1,978	Rig #5	Well #12	23,490
17	1,122	1,848	1,343	1,620	1,610	1,453		Well #13	33,510
18	1,122	2,054	1,134	1,080	1,840	1,724		Well #14	-
19	855	1,848	1,771	2,340	1,810	1,920			57,000
20	1,496	2,054	1,781	1,860	2,070	1,335	Rig #6	Well #15	9,068
21	1,870	1,848	1,433	2,160	1,840	1,740		Well #16	38,110
22	1,663	2,054	1,600	1,980	1,840	1,484		Well #17	-
23	1,496	2,054	2,112	1,580	1,820	1,742		Well #18	-
24	2,203	2,054	1,521	1,620	1,840	1,768			47,178
25	1,309	1,848	1,572	1,260	2,090	1,906			
26	1,496	1,848	1,572	900	1,840	1,906			
27	1,309	1,848	1,572	700	2,070	1,906			
28	1,309	1,848	1,572	1,390	1,840	1,704			
29	1,309	2,054	1,600	1,860	2,070	1,768			
30	1,309	2,054	1,600	1,860	2,070	1,768			
31	1,309	2,054	1,600	1,860	2,070	1,768			
Subtotal	41,995	56,834	50,638	51,200	57,000	47,178			

	Rig #1 (gallons)	Rig #2 (gallons)	Rig #3 (gallons)	Rig #4 (gallons)	Rig #5 (gallons)	Rig #6 (gallons)	Rig	Wells	Feb (gallons)
February									Totals (gallons)
1	1,600	1,850	1,572	1,800	2,070	1,755	Rig #1	Well #1	38,068
2	1,700	2,054	2,390	1,800	1,380	1,990		Well #2	-
3	1,500	1,848	1,572	1,800	2,070	1,726			38,068
4	1,500	1,221	1,889	1,440	1,380	1,274	Rig #2	Well #3	19,696
5	1,600	1,848	1,753	1,800	2,300	1,345		Well #4	30,976
6	1,000	2,054	1,591	1,620	1,840	978		Well #5	-
7	600	1,848	1,591	1,620	1,870	743			50,672
8	1,000	2,054	1,452	1,400	1,840	1,704	Rig #3	Well #6	31,060
9	1,200	811	1,809	1,620	1,610	1,153		Well #7	14,755
10	1,200	1,848	1,572	1,620	1,840	2,387		Well #8	-
11	1,500	1,233	1,594	1,440	1,610	1,121			45,815
12	1,200	1,027	1,978	1,440	1,840	1,591	Rig #4	Well #9	42,580
13	1,300	1,897	1,897	1,800	1,840	1,925		Well #10	2,680
14	1,300	1,307	2,341	1,700	1,700	1,303		Well #11	-
15	1,122	2,054	1,902	1,440	1,610	1,980			45,260
16	1,496	1,848	1,591	1,800	1,340	1,978	Rig #5	Well #12	23,490
17	1,122	1,848	1,343	1,620	1,610	1,453		Well #13	27,990
18	1,122	2,054	1,134	1,080	1,840	1,724		Well #14	-
19	855	1,848	1,771	2,340	1,810	1,920			51,480
20	1,496	2,054	1,781	1,860	2,070	1,335	Rig #6	Well #15	9,068
21	1,870	1,848	1,433	2,160	1,840	1,740		Well #16	35,803
22	1,663	2,054	1,600	1,980	1,840	1,484		Well #17	-
23	1,496	2,054	2,112	1,580	1,820	1,742		Well #18	-
24	2,203	2,054	1,521	1,620	1,840	1,768			44,671
25	1,309	1,848	1,572	1,260	2,090	1,906			
26	1,496	1,848	1,572	900	1,840	1,906			
27	1,309	1,848	1,572	700	2,070	1,906			
28	1,309	1,848	1,572	1,390	1,840	1,704			
Subtotal	38,068	50,672	45,815	45,260	51,480	44,671			

	Rig #1 (gallons)	Rig #2 (gallons)	Rig #3 (gallons)	Rig #4 (gallons)	Rig #5 (gallons)	Rig #6 (gallons)	Rig	Wells	Mar (gallons)
March									Totals (gallons)
1	1,500	1,492	1,315	2,180	1,890	781	Rig #1	Well #1	5,200
2	800	1,648	1,340	1,080	1,650	1,587		Well #2	31,822
3	900	2,153	1,315	1,390	1,840	2,498			37,022
4	1,200	1,848	1,900	1,350	1,610	896	Rig #2	Well #3	-
5	800	1,848	1,315	1,390	1,840	1,303		Well #4	10,658
6	600	2,054	1,315	1,390	1,840	1,945		Well #5	38,856
7	600	2,054	1,315	1,390	1,840	1,591			49,512
8	600	821	1,315	1,390	1,840	1,591	Rig #3	Well #6	-
9	1,200	1,233	1,572	1,440	1,610	2,152		Well #7	22,447
10	1,200	1,232	1,571	1,440	1,610	1,733		Well #8	25,588
11	1,200	1,848	1,572	1,440	2,070	1,793			48,035
12	1,200	1,643	1,572	1,440	1,840	1,594	Rig #4	Well #9	-
13	1,200	1,848	1,572	1,440	1,840	1,956		Well #10	37,400
14	1,200	1,232	1,978	1,390	1,780	1,685		Well #11	10,270
15	1,122	1,848	1,250	1,572	1,610	1,959			47,570
16	1,122	2,054	1,800	1,572	1,610	1,990	Rig #5	Well #12	-
17	900	1,848	1,170	1,310	1,840	2,364		Well #13	10,730
18	1,309	1,848	1,591	1,350	1,580	1,878		Well #14	41,160
19	1,122	2,054	1,591	1,350	2,070	1,172			51,890
20	1,122	811	1,562	1,350	1,670	600	Rig #6	Well #15	-
21	1,196	1,848	1,701	1,390	2,070	600		Well #16	-
22	1,122	1,848	1,168	1,390	1,870	750		Well #17	38,736
23	1,122	2,054	1,587	1,390	1,560	950		Well #18	4,119
24	1,122	2,054	1,594	1,390	2,070	1,012			42,855
25	1,400	1,232	1,572	750	2,070	720			
26	1,122	800	1,705	1,260	1,970	650			
27	1,309	1,438	1,158	1,060	1,380	620			
28	1,122	1,848	1,590	1,720	1,610	890			
29	1,500	2,054	1,398	1,320	1,840	533			
30	1,500	2,540	1,974	1,620	1,610	591			
31	1,500	1,428	1,121	1,620	1,380	1,183			
Subtotal	37,022	49,512	48,035	47,670	51,890	42,855			

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